REMARKS

In response to the non-final Official Action of December 13, 2003, applicant respectfully requests reconsideration of the claims of the pending application, namely, claims 15-28. More specifically, with respect to paragraphs 1 and 2 of the Official Action, it is respectfully submitted that claims 15, 16, 18, 19, 22, 23, 24 and 26 are neither anticipated nor obvious in view of US Patent No. 998,567 (Fessenden). More specifically, Fessenden discloses an antenna for electromagnetic wave telegraphy in which supports for the antenna are formed of a combination of conducting and insulating material of a character which would block off receipt of the waves if used in the usual manner, but are arranged and placed so as not to interfere with the reception or emission of the waves. Figure 1 shows a tower 1 constructed of concrete and iron bars with the antenna 2 (a plurality of long wires) supported on it by means of posts 4, 5, 6, 7, 8 and 9 and a station 10 facing in the direction from which it is desired to receive the electromagnetic waves. In Figure 2 of Fessenden, ferro-concrete structures 11, 12, 13 and 14 are used to support the antenna 15 (a plurality of long wires) and the station 16 is placed in the direction to or from which it is desired to send or receive the electromagnetic waves. It is clear from the disclosure and figures in Fessenden that it is directed to the use of long wires forming the antenna such as were common at the time the application was filed (1906) for the reception and transmission of wireless telegraphy. It is respectfully submitted that the antenna 2 which is formed from wires is not in any way anticipatory or suggestive of a continuous, non-planar radiator surface, wherein that surface is defined by variations in depth of the radiator surface. As set forth in the American Heritage Dictionary of the English Language, 4th Ed. (2000), the definition of "surface" is:

> "2. Mathematics a. The boundary of a three-dimensional figure. b. The two-dimensional locus of points located in three-dimensional space. c. A portion of space having length and breadth but no thickness."

It is respectfully submitted that the individual wires of Fessenden forming the antenna 2 shown in Figure 1 or antenna 15 shown in Figure 2 do not have a "surface" in the generally accepted definition of "surface" as presented above, but rather define a one-dimensional element, namely, a line. Thus the wires forming the antennas shown in Fessenden do not have a surface, but rather have a linear dimension only. The air between the wires forming the antenna shown in Fessenden cannot be considered to be a radiating surface, but rather represent a dielectric between radiating wires. It is

respectfully submitted that Fessenden does not disclose or suggest independent claim 15 and dependent claims 16, 18, 19 thereto, nor does it disclose or suggest independent claim 22 and dependent claims 23, 24 and 26 thereto. In short, Fessenden does not disclose or suggest a continuous radiating surface.

Referring now to paragraph 3 of the Official Action, it is respectfully submitted that US Patent No. 4,888,597 (Rebiez et al.) does not disclose or suggest claims 15-28 of the present application. Rebiez et al. discloses a millimeter and submillimeter wave antenna structure, and specifically an antenna array, and more specifically an array of horn elements. With reference to Figure 2 cited by the Examiner in the Official Action, the only antennas shown in Figure 2 are antennas 54, 59 and 64, which are antenna elements of the horn antenna arrangements (see column 3, lines 58-60, and column 4, lines 50-58). It should be noted that the "V" shape situated around each of the antennas 54, 59 and 64 form the horn for collecting received radiation and reflecting such radiation onto the respective antenna. Thus, the surfaces of the "V" shape structure form reflectors, for reflecting radiation to and from respective antennas 54, 59 and 64 (see column 5, lines 26-32).

At paragraph 2 of the Official Action, the Examiner suggests that reference numerals 47, 51, 52 and 58 define an antenna including a continuous, non-planar radiator surface. It is respectfully submitted that this interpretation by the Examiner is incorrect. Reference numerals 47 and 58 denote surfaces of a reflecting cavity (see column 4, lines 1-4). Similarly, reference numerals 51 and 52 denote side walls of the horn (making a horn shape) for the antenna. Specifically, Rebiez et al. states at column 4, lines 1-4, that the back structure 40 includes plural pyramid-shaped reflecting rear cavities, e.g., 65, 70 and 75, each bound by four surfaces, of which two are shown (47 and 58, 71 and 73, 76 and 77, respectively).

Both independent claims 15 and 22 require an antenna which includes a continuous, non-planar radiator surface. The only antenna disclosed in Rebiez et al. are the small planar radiator antennas 54, 59 and 64 as noted above. No other surface or element shown in Figure 2 of Rebiez et al. is a radiating surface, but rather the surfaces denoted in the Official Action (47, 51, 52 and 58) are merely reflecting surfaces. Rebiez et al. makes this perfectly clear at column 4, lines 51-59, wherein it states:

> "Hence the antennas 54, 59 and 64 may radiate as if they were suspended in free space unencumbered by auxiliary supporting structures. Those skilled in the art can fabricate membranes having different frequency response characteristics more suitable for other applications. The millimeter and submillimeter wave antennas, e.g., 54, 59 and 64, are mounted on the back surface of the membrane 45 and hence suspended within the horns."

The horns are shown in Figure 2 as 92, 94 and 96, and have the structure which the Examiner incorrectly claims is a radiating surface. Since independent claims 15 and 28 both require a continuous, non-planar radiator surface, it is respectfully submitted that the radiator surfaces 54, 59 and 64 in Rebiez et al., as seen in Figures 2 and 3 thereof, do not in any way disclose or suggest the antenna claimed in independent claims 15 and 18. Consequently, the dependent claims to these independent claims (16-21 and 23-28) are further distinguished over Rebiez et al.

Furthermore, with respect to claim 15, Rebiez et al. does not disclose a radiator surface which is defined by variations of the depth of the radiator surface. The horns 92, 94 and 96 shown in Figure 2 of Rebiez et al. are pyramids of a dielectric forming an array of horns. With regard to claim 22, there is no ground plane shown in Rebiez et al. As stated above, Rebiez et al. does not disclose a continuous, non-planar radiator surface and further does not disclose a planar ground plane provided opposite such a radiator surface. The surface 40, which the Examiner states is a planar ground plane, is in fact merely the designation of a back substrate formed of a monolithic block (see column 3, lines 35-37).

Therefore, it is respectfully submitted that claims 15-28 are neither anticipated nor suggested by Rebiez et al.

Referring now to paragraph 4 of the Official Action, it is respectfully submitted that US Patent No. 2,573,401 (Carter) and US Patent No. 5,155,493 (Thursby et al.) alone, together, or in combination with the previously cited art, do not disclose or suggest the present invention as claimed. More particularly, Carter is directed to a louver antenna designed to be mounted on the nose of an airplane for providing directive radiation patterns for navigation purposes. In particular, Figures 1, 2 and 3 of Carter show that the antennas 20 are mounted to the hull of the airplane which acts as a ground sheet 11. The antenna is formed by a plurality of inclined metallic flaps 21, 22, 23, 24 and 25, each of these flaps attached to the ground plane along one edge and tilted up at an angle theta. Thus the arrangement of the antenna has an appearance of a louvered metal sheet. The antenna 20 does not

disclose or suggest a continuous, non-planar radiator surface as disclosed and claimed in the present invention. Therefore, it is respectfully submitted that this reference neither discloses nor suggests the present invention as claimed.

Thursby et al. discloses a tape type microstrip patch antenna which uses electrically conductive foil tape with adhesive applied to one surface to create a radiating element and a ground plane. Figure 1 of Thursby et al. shows a cylindrical surface 10 on which a tape-base microstrip patch antenna 12 is mounted. With regard to claim 15, it is clear from the disclosure and figures of Thursby et al. that the antennas shown do not have a continuous, non-planar radiator surface wherein the non-planar radiator surface is defined by variations in the depth of the radiator surface. With regard to claim 22, if the foil tape 18 shown in Figure 1 is considered to be non-planar when positioned on a cylindrical surface 10, then it is clear that the cylindrical surface 10 must be considered non-planar also, and therefore the limitation in claim 22 concerning the requirement for a planar ground plane provided opposite the radiator surface is not met nor suggested by Thursby et al. Therefore it is respectfully submitted that since independent claims 15 and 22 are not suggested by Thursby et al., then the dependent claims thereto are further distinguished over Thursby et al.

For all of the foregoing reasons, it is respectfully submitted that the present application as claimed is distinguished over the cited art, and therefore the present application as claimed is believed to be in condition for allowance.

Respectfully submitted,

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